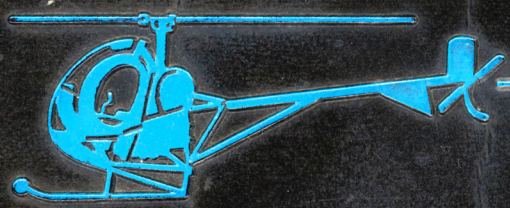
Owner's Maintenance & Flight Manual



HUGHES 269A

HUGHES TOOL COMPANY · AIRCRAFT DIVISION · CULVER CITY, CALIFORNIA

WELCOME . . . and THANK YOU!

Customarily, an owner's handbook begins by flattering the newly acquired product it represents. It does this by congratulating the purchaser on the wisdom of his or her choice.

We feel a little differently about it.

We feel like saying **welcome.** We're happy **you** can share the **realization** of an idea that captured the imagination of the whole world and held it fast for hundreds of years—the **magic carpet** idea. Today's modern helicopters really are like a flying carpet—fast, nimble, responsive to command. They take you anywhere you want to go. They fly you above earth-bound traffic, but below fixed-wing airways. They offer you panoramic visibility, and the pure fun of flying.

We also say **thank you** for choosing the Hughes 269A. We appreciate the faith you have put in our company and our helicopter. Working with your Hughes Dealer, we will do everything possible to make your choice as satisfying a year—or ten years—from now as it is today.

HUGHES TOOL COMPANY
AIRCRAFT DIVISION
CULVER CITY, CALIFORNIA

CONTENTS

DESIGN FEATURES

- Specifications
- Flight Controls
- Electrical System
- Power Plant
- Landing Gear
- Fuel System
- Cabin Features

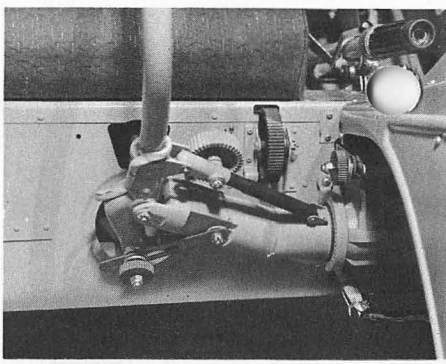
SPECIFICATIONS

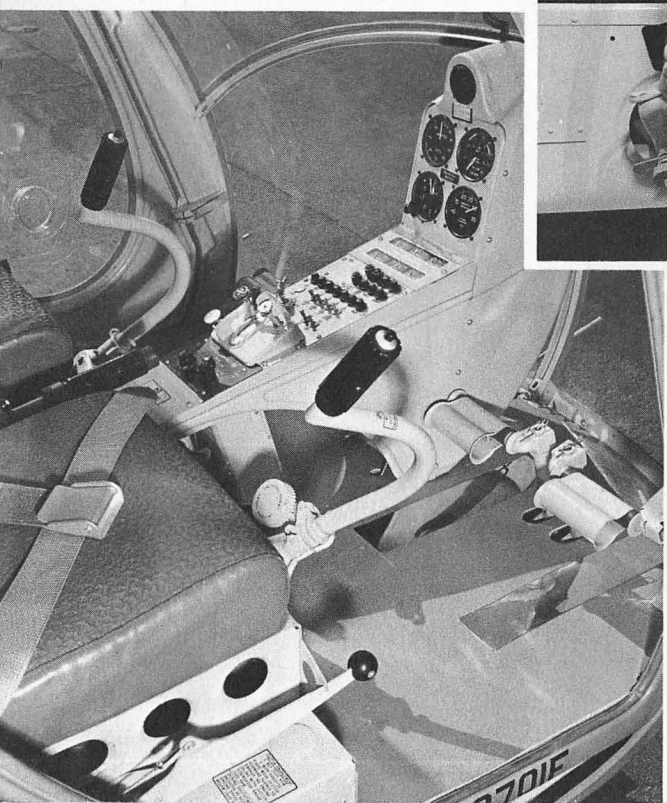
Engine	Lycoming 0-360-C2D
HP–RPM	180 @ 2700
Gross Weight	1550 lbs.
Empty Weight (standard)	910 lbs.
Useful Load	640 lbs.
Length (over-all)	22 ft. 3 in.
Height (over-all)	7 ft. 11 in.
Width (fuselage)	4 ft. 3 in.
Rotor Diameter	25 feet
Fuel Capacity (standard)	25 U.S. gals.
Maximum Red Line Speed, at sea level	86 mph
Cruising Speed, at sea level	83 mph
Service Ceiling	11,500 ft.
Normal Range	200 mi.

Performance figures are for gross weight.

FLIGHT CONTROLS

Flight controls in the 269A include rudder pedals, collective and cyclic sticks. Trim and friction controls provide exceptional in-flight stability as well as ease of control. The 269A's unique eight-belt drive system delivers vibration-free power to the main transmission, and allows pilot to engage or disengage the rotor system while the engine is running. Constant, positive engagement or disengagement is provided by a hand lever located on the right side of the right seat. Dual flight controls are available as optional equipment. Both collective and cyclic sticks feature quick-removal attachments; rudder pedals are adjustable.





ELECTRICAL SYSTEM

A standard 12 volt 24 ampere hour lead acid battery enables engine starting without the need of external power. Electrical power is supplied by a 12 volt 20 amp. generator as standard equipment and is belt driven by the engine. The power output is controlled by a voltage regulator. A night flying kit including two rotating beacons, a landing light, position lights, instrument lights and 50 amp. generator is available as optional equipment.

POWER PLANT

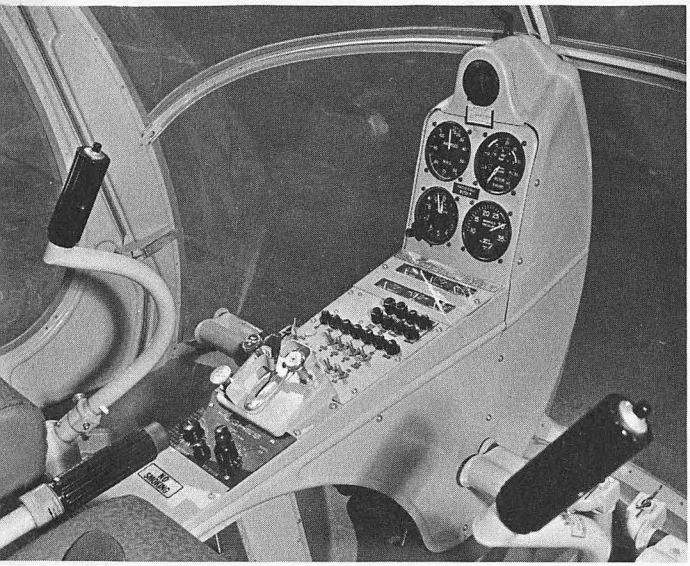
The Hughes Model 269A is powered by a Lycoming 0-360-C2D Engine, rated at 180 hp @ 2700 rpm. It features a Bendix pressure carburetor, has an 8.5-1 compression ratio and requires a minimum 91/96 octane aviation fuel.

LANDING GEAR

The landing gear is a skid-type featuring air-oil shock struts which permit soft landings on flat or uneven terrain. Wheels can be quickly moved to center position for one-man ground handling. (See illustration Section V.)

FUEL SYSTEM

The welded all-aluminum fuel tank has a total and usable capacity of 25 U.S. gallons. The system is pressurized, and includes an engine driven pump, electric boost pump, strainer, gage and shut-off valve.



You will find comfort where it counts in your compact 269A. All instruments, switches and controls are in a convenient location.

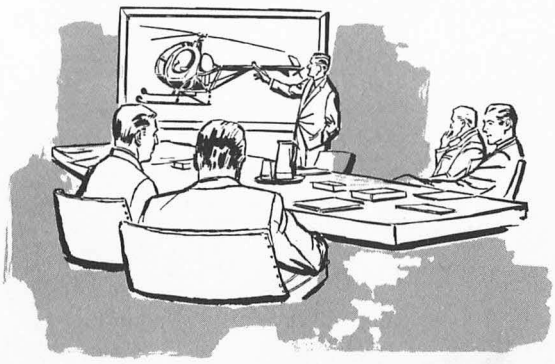
The custom style seats feature two storage compartments. The top section may be used for small articles: maps, log books, etc., and the fold-out bottom sections are large enough for a small briefcase.

OPERATING LIMITATIONS

INTRODUCTION

In order to help you achieve maximum utility and optimum safety in the operation of your Hughes Helicopter Model 269A, Sections I through III of this Manual set forth the performance data, operating procedures and limitations of this aircraft.

The information is presented in compliance with—and with the approval of—FAA regulations governing these subjects. Study these Sections thoroughly—they will give you an accurate insight into the capabilities of your helicopter.



THIS HELICOPTER MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS AS SET FORTH IN SECTION I OF THIS HANDBOOK.

MODEL 269A HELICOPTER

Serial Numbers 0011 and subsequent

TYPE CERTIFICATE NO. 4H12

REGISTRATION NO. _____

SERIAL NO. 0061

APPROVED BY Rocco Lippis

for Chief Aircraft Engineering Branch
Federal Aviation Agency

DATE OF APPROVAL July 27, 1962

NOTE: This manual supersedes Model 269A manual previously approved Sept. 28, 1961, and all subsequent revisions.

This Handbook Must Be Kept In The Aircraft At All Times

HUGHES MODEL 269A HELICOPTER
FAA APPROVED FLIGHT MANUAL

LOG OF PAGES

	Page	Date
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	1.2 Log of Pages	
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	2.8	May 15, 1962
	2.9	May 15, 1962
SECTION III	3.1	Sept. 28, 1961
	3.2	May 15, 1962
	3.3	May 15, 1962

APPROVED by Oreste Pippo
for Chief Aircraft Engineering Branch
Federal Aviation Agency

DATE July 27, 1962

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	3.2	Sept. 1, 1962
	3.3	Sept. 1, 1962

APPROVED by Pasco Lippis
for Chief Aircraft Engineering Branch
Federal Aviation Agency

DATE Sept 1, 1962

SECTION 1

OPERATING LIMITATIONS

1. AIR SPEED LIMITATIONS

   a. The never exceed speed (V_{ne}) is 86 mph IAS at sea level.

   b. Above sea level reduce (V_{ne}) in accordance with Part 6, 2-d, Pg. 1.7; and Fig. B, Pg. 1.9.

2. ROTOR SPEED LIMITATIONS

   a. Maximum rpm: 530

   b. Minimum rpm: 400

3. POWER PLANT LIMITATIONS

   Lycoming Engine 0-360-C2D

   a. Take off, five minutes, 2900 rpm, 26" mp, (165 HP at sea level varying linearly to 171 HP at 2500 feet.)

   b. Maximum continuous operation: 160 HP at 2700 rpm (26" mp at sea level, varying linearly to 24.8" mp at 4000 feet).

   c. Minimum operation: 2500 rpm to 9000 feet altitude. See Part 6, 2-d, Pg. 1.7 for airspeed vs. altitude/rpm limits.

   d. Range for idle and clutch engagement 1200 to 1600 rpm.

   e. Fuel: minimum octane 91/96.

   f. Oil: SAE 50 above 40^{o}F. SAE 30 below 40^{o}F. SAE 20 below 10^{o}F.

4. FLIGHT LIMITATIONS

   a. Operate in accordance with Fig. A, Pg. 1.8 Airspeed vs. altitude limitations.

FAA approved Sept. 1, 1962
Model 269A Helicopter

b. Instrument flight prohibited.

c. Night flight prohibited when landing, navigation, map, or instrument lights are not installed. Night flight operation is limited to visual contact flight conditions. Orientation shall be maintained through visual reference to ground objects solely as a result of lights on the ground or adequate celestial illumination.

d. Rearward flight or hovering downwind can be conducted up to speeds of 23 mph IAS. Maximum possible operating wind velocities have not been established.

e. Minimum crew, one pilot.

f. Continuous hover at 2700 rpm 5 feet maximum skid height permitted.

5. WEIGHT AND CG LIMITATIONS

a. Maximum takeoff and landing weight: 1550 pounds.
NOTE: This helicopter is to be operated in accordance with the approved loading schedule (see Section IV).

b. Forward CG limit station: 95.0.

c. Aft CG limit station: 100.0.

d. Datum line (Station 100) is rotor centerline.

6. MARKINGS AND PLACARDS

1. Instrument Markings
General:
Red radial lines; maximum and minimum limits.
Yellow arc: cautionary range.
Green arc: normal operating range.

a. Engine Oil Temperature
Red radial line: 104° and 244°F.
Green arc: 160° to 244°F.
Yellow arc: 104° to 160°F.

b. Engine Oil Pressure
Red radial lines: 60 and 85 psi.
Green arc: 60 to 85 psi.

c. Cylinder Head Temperature

Red radial line: 500°F.

Green arc: 230° to 450°F.

Yellow arc: 450° to 500°F.

d. Fuel Pressure

Red radial lines: 9 and 15 psi.

Green arc: 9 to 15 psi.

e. Transmission Oil Temperature and Pressure

Warning lights on the instrument panel come on when transmission oil pressure drops below 2½ ±¼ psi or temperature exceeds 235°F.

f. Engine Tachometer

Red radial lines: 2500 and 2900 rpm.
Green arc: 1200 to 1600 and 2500 to 2700 rpm.
Yellow arc: 2700 to 2900 rpm.

g. Rotor Tachometer

Red radial lines: 400 rpm and 530 rpm.
Green arc: 400 to 530 rpm.

h. Air Speed Indicator

Red radial line: 86 mph.
Green arc: 40 to 86 mph.

i. Manifold Pressure

Red radial line: 26 inches

j. Carburetor Air Temperature (optional)

Red radial line: at 125°F.

Green arc: 60° to 105°F.

Yellow arc: 15° to 60°F.

2. Flight Limitation Placards

(a.)

CHECK LIST
TAKE-OFF AND LANDING
CARBURETOR HEAT
FUEL BOOST PUMP ON
SOLO FLIGHT PROHIBITED FROM LEFT SEAT
400 LBS. MAX. GROSS IN CABIN
ACROBATIC MANEUVERS PROHIBITED

(b.)

CLUTCH ENGAGEMENT
1. SET 1500 RPM.
2. WITH THROTTLE FIXED MOVE CLUTCH FORWARD SLOWLY TO ENGAGE. NO ENGINE IDLING WITH CLUTCH DISENGAGED ABOVE 1600 RPM.
DURING SHUTDOWN DECLUTCH AS SOON AS ENGINE SPEED IS BELOW 1600 RPM.

(c.)

THIS HELICOPTER MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS SPECIFIED IN THE FAA APPROVED ROTORCRAFT FLIGHT MANUAL

(d.)

NEVER EXCEED SPEEDS - MILES PER HOUR (IND. AIR SPEED)											
ALTITUDE	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
2700 2900 RPM	86	85	84	83	82	81	79	78	75	66	58
2500 RPM	86	85	84	83	79	73	66	58	51	44	–

(e.)

NO
SMOKING

This placard not required if ash tray is installed

(f.)

1. 2900 RPM below 200 feet (5 minute limit)
   See Rotorcraft flight manual for Hover RPM.
2. 2700 RPM minimum between 200 and 500 feet.

3. Heater Operation — Placard and Limits

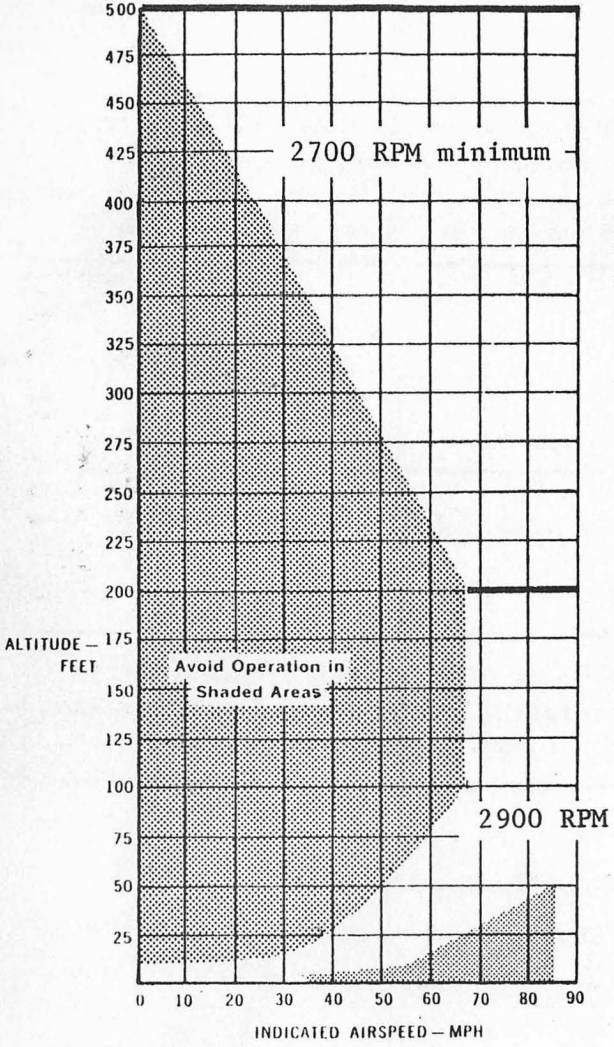
(Reference to Stewart-Warner Series 940 Heater installed in accordance with HTC Drawing No. 269A 4770.)

(a.) **Placard**

FOR HEATER OPERATION ON GROUND WITH ENGINE NOT RUNNING, MIXTURE CONTROL MUST BE IN IDLE CUT-OFF

(b.) **Limits**

HEATER OPERATION ON GROUND WITH ENGINE RUNNING MUST BE LIMITED TO 5 MINUTES DURATION



HUGHES MODEL
269A
HELICOPTER

Figure A

AIRSPEED VS ALTITUDE LIMITATIONS

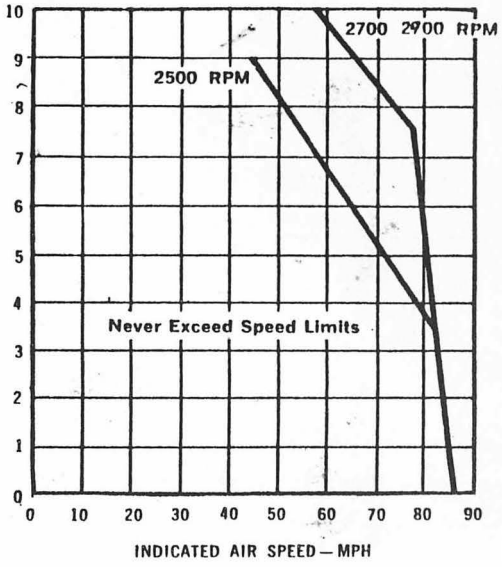
NOTE:

Determined only under following conditions:

Smooth Hard Surface
Maximum Gross Weight
Calm Wind
Sea Level Altitude

HUGHES MODEL
269A
HELICOPTER

Figure B



VARIATION OF V_{NE} WITH ALTITUDE & RPM

OPERATING PROCEDURES

SECTION II

OPERATING PROCEDURES

I. Normal Operating Instructions

A. Before Entering Cockpit

1. Have a thorough understanding of operating limitations (Section I).
2. Ensure that the loading is in accordance with Section IV.
3. Determine that a Preflight Inspection has been conducted.
4. Check Section III for Performance Information.

B. Upon Entering Cockpit

1. Adjust rudder pedals.
2. Inspect and adjust safety belts.
3. Check movement of flight controls and establish that rotor blades are in pattern, as evidenced by low cyclic stick force.
4. Set longitudinal cyclic trim to full forward and lateral cyclic trim to full left.
5. Apply moderate friction to cyclic stick to maintain position.
6. Collective stick down, friction full **on.**
7. Set altimeter.
8. All electrical switches **off**; fuses in place.
9. External power plugged in if available.
10. Battery switch **on**.

11. Check fuel quantity.
12. Press-to-test transmission oil temperature light—check transmission oil pressure light **on**.
13. Belt drive disengaged (clutch lever aft).

    CAUTION: MAINTAIN HAND PRESSURE AGAINST PRELOAD ON LEVER WHILE DISENGAGING CLUTCH.

C. Starting the Engine

1. Carburetor air on **cold**.
2. Fuel shut-off valve **on**.
3. Mixture control **in**.
4. Throttle fully closed or slightly cracked.

   CAUTION: Do not open throttle excessively as engine overspeed may result.
5. Ignition switch to **both** to start.

   NOTE: Starting system actuates ignition vibrator on left magneto and grounds out right magneto during start.
6. Press starter button to engage starter.
7. After four or five revolutions of the engine by starter, engine hasn't fired, turn fuel boost switch to **on** and continue cranking.

   CAUTION: Turn fuel boost switch to **off** when starter switch is not depressed. Continued operation of boost pump with engine stopped will flood the carburetor.

   NOTE: It may be necessary in extremely cold

weather (20°F and below) to prime the engine. The procedure is as follows:

a. Mixture control **out** (idle cut off).

b. Boost pump switch **on**.

c. Pull primer out and hold for two seconds before pushing in, repeat a second time. After pushing primer in the second time be sure primer is in locked position.

d. Boost pump **off**.

e. Mixture control **in** (full rich).

f. Proceed with starting procedure as noted above.

CAUTION. DO NOT OVER-PRIME. Primer is pressure operated and priming continues as long as primer is not full in.

8. When engine starts, idle at minimum speed possible to keep engine running smoothly (900-1100 rpm).

   NOTE: Avoid continuous idling above 1600 rpm with rotor disengaged. Such operation will result in resonance in the engine output shaft. CAUTION: If minimum of 25 psi oil pressure is not indicated within thirty seconds after engine starts, shut down engine and determine the cause.

9. Disconnect external power if used.

10. Generator switch **on**.

D. Rotor Engagement

1. Collective pitch stick full down, friction full on.

2. Rudder pedals and cyclic stick in neutral.
3. Engine speed 1500 rpm.
4. While maintaining **fixed throttle**, slowly move clutch lever forward until rotor begins to turn. Control rate of engagement so that engine rpm does not fall below 1100 rpm (do not increase throttle). Continue to engage until lever is down in fully engaged position.
5. After rotor is engaged, engine will be running at about 1200 rpm. Avoid continuous operation below 1200 rpm with rotor engaged, as tail rotor drive shaft may develop resonance. CAUTION: Rotor rpm and engine rpm indicator needles must always be superimposed when engine is driving rotor. Any other condition indicates belt slippage, tachometer system malfunctioning, or other mechanical drive failure. If this condition exists, shut down engine and investigate.

E. Warm-up and Ground Check

1. Warm up at 1800 rpm until oil temperature and pressure are within the green arcs. Check transmission oil pressure and temperature warning lights, which should be out.
2. Carburetor heat as required.
3. Open throttle to increase engine speed to 2000 rpm. Check ammeter for proper indication (0 to +20 amperes normally).

4. Check response of controls at 2000 rpm full low pitch by gently moving cyclic stick. Observe rotor tip for correct movement and track.
5. Check magnetos at 2000 rpm engine speed and slight collective pitch (15 inches manifold pressure). Maximum allowable drop is 125 rpm on either magneto, with no engine roughness.
6. With engine rpm stabilized at 2000 rpm (collective full down), close throttle to check separation of tachometer needles for proper overrunning clutch operation.

II. Takeoff and Landing

A. Takeoff

1. Follow normal helicopter takeoff procedure at 2900 rpm. (Five minute limit.)
2. Climb out speed for takeoff is 70 mph IAS up to 300 feet. Reduce to best climb speed (45 mph IAS) above 300 feet. See Height-Velocity Diagram, Sec. I, Pg. 1.8, Fig. A.

NOTE: 2900 RPM five minute limit. Then reduce to 2700 RPM 160 hp (26" mp sea level, varying linearly to 24.8" mp at 4000 feet).

B. Approach to Landing.
Increase engine RPM to 2900.

C. Running Landing

1. Maximum recommended ground contact is 35 mph IAS for smooth hard surface.
2. After ground contact, avoid rapid lowering of collective pitch.

D. Stopping Engine and Rotors

1. Declutch rotor. (To avoid ratcheting of overrunning clutch, declutch as soon as engine speed is below 1600 rpm.)
2. Idle engine at 1500 rpm until a definite decrease of engine cylinderhead temperature is obtained.
3. Turn ignition switch to **off**.
4. Set all electrical switches to off position.
5. Do not use collective pitch to stop rotor.

III. Emergency Operating Instructions

A. Engine Failure

1. Engine failure while hovering or on takeoff **below 10 feet**: A power failure is indicated by a sudden yawing of the ship to the left. In the event of such failure, **do not reduce Collective pitch**. Apply right pedal to prevent excessive yawing. Apply collective pitch as necessary in order to cushion landing.
2. Engine failure during takeoff; altitude **above 10 feet, below** 500 **feet**: CAUTION: In order to effect a safe autorotation landing in the event of engine failure, takeoff operation should be conducted in accordance with the restrictions shown on Height-Velocity diagram, Section I, Pg. 1.8, Fig. A. In the event of power failure during takeoff, the collective pitch must be initially lowered in order that the rotor speed may be maintained. The amount and duration of collective reduction depends upon the height above the ground at which the engine failure occurs.

As the ground is approached, back cyclic and collective should be used as needed to decrease forward and vertical velocity. Ground contact should be established with a slight nose high attitude.

3. Engine failure **above** 500 **feet altitude**:

   a. Enter normal autorotation.

   b. Establish a steady glide of 65 to 70 mph IAS.

   c. At an altitude of about 50 feet, begin to steadily apply back cyclic stick to decrease forward speed.

   d. At approximately 10 feet, coordinate collective pitch with aft movement of cyclic stick to cushion landing. At ground contact a slight nose-high landing on the skid is accomplished.

   e. Avoid rapid lowering of collective pitch.

   f. In event of engine failure at night, do not turn on landing light above 1000 feet above terrain in order to preserve battery power.

B. Ditching with Power

1. Descend to hovering attitude over water.
2. Turn battery and generator switches off; leave ignition switch on.
3. Maintain level attitude and accomplish normal landing. As contact is made with water, apply sideward stick causing rotor blades to strike water.
4. Release safety belt.
5. Climb out door and clear aircraft as quickly as possible.

C. Ditching Without Power

1. Turn off battery and ignition switches.
2. Make autorotative glide at 65 to 70 mph IAS.
3. Apply back pressure on cyclic to arrest forward flight before contact.
4. Apply collective pitch to cushion landing.
5. As contact is made with water, level helicopter and apply sideward stick, causing rotor blades to strike water.
6. Release safety belt.
7. Climb out door and clear aircraft as quickly as possible.

D. Tail Rotor Failure

Tail rotor failure is indicated by a sudden yawing to the right. The only way to prevent this yawing is to close the throttle. Thereafter, follow the same procedure as for an engine failure.

IV. Heater Operating Instructions

A. Stewart-Warner Heater Ground Operating Instructions—Engine **Not Running**

1. Place mixture control in idle cut-off.
2. Fuel boost pump to ON position.
3. Heater control switch to prime (2 seconds).
4. Heater control switch to ON position.
5. Regulate push pull control for temperature desired in cabin.
6. Return heater control switch to OFF position to discontinue heater operation.

B. Stewart-Warner Heater Operating Instructions—Engine **Running** (Limit Operation to 5 Minutes on Ground)

1. Heater control switch to prime (2 seconds).
2. Heater control switch to ON position.
3. Regulate push pull control for temperature desired in cabin.
4. Return heater control switch to OFF position to discontinue heater operation.

PERFORMANCE DATA

SECTION III

PERFORMANCE DATA

The following performance data are based on normal gross weight (1550 lbs.) and standard conditions.

Speed for best rate of climb	40-45 mph IAS
Hovering ceiling (3-foot skid height)	6,300 feet
Estimated hovering ceiling, out of ground effect	4,000 feet

Air Speed Calibration

Indicated Air Speed (IAS) corrected for position and instrument error equals Calibrated Air Speed (CAS). Determine corrected IAS from the Airspeed Calibration Curve on Pg. 3.2.

Figure C

HOVER CEILING VS TEMPERATURE MAXIMUM PERFORMANCE

Chart 1

Applicable to Model 269A Helicopters with Lycoming O-360-C2D Engine Serial Nos. L-4600-36, L-4641-36 and subsequent

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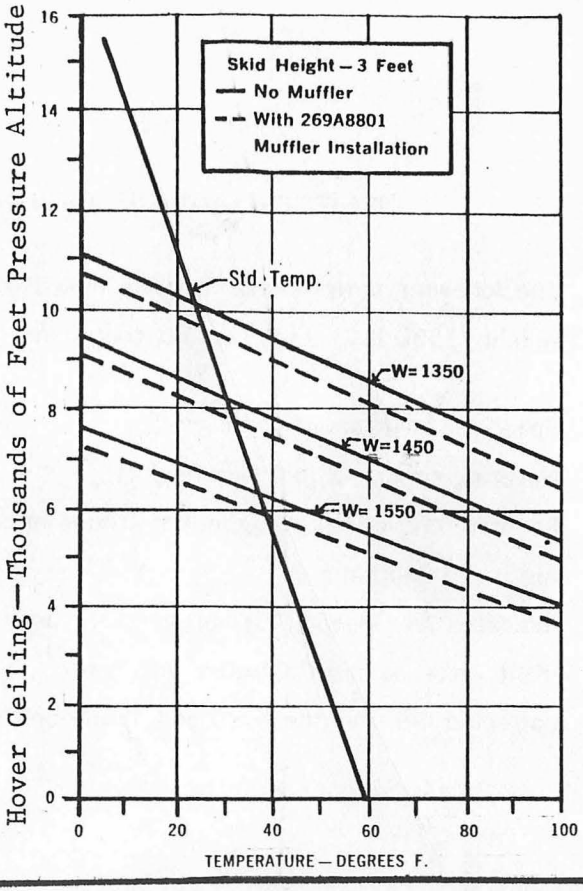


HUGHES MODEL 269A HELICOPTER

Figure D

AIRSPEED CALIBRATION CURVE

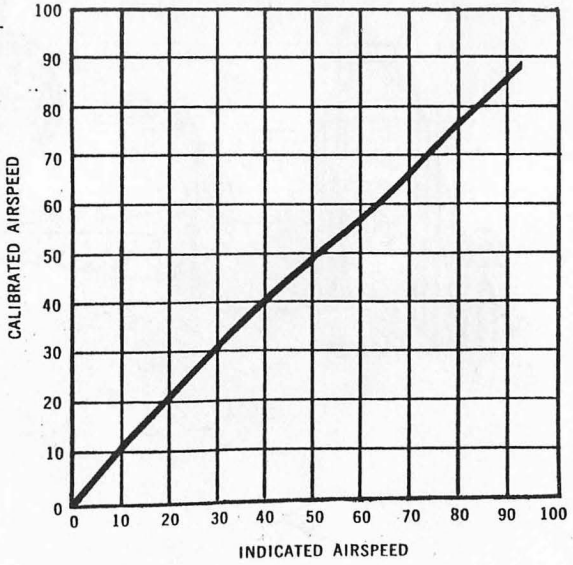


Figure E

HOVER CEILING VS TEMPERATURE ALTERNATE PERFORMANCE

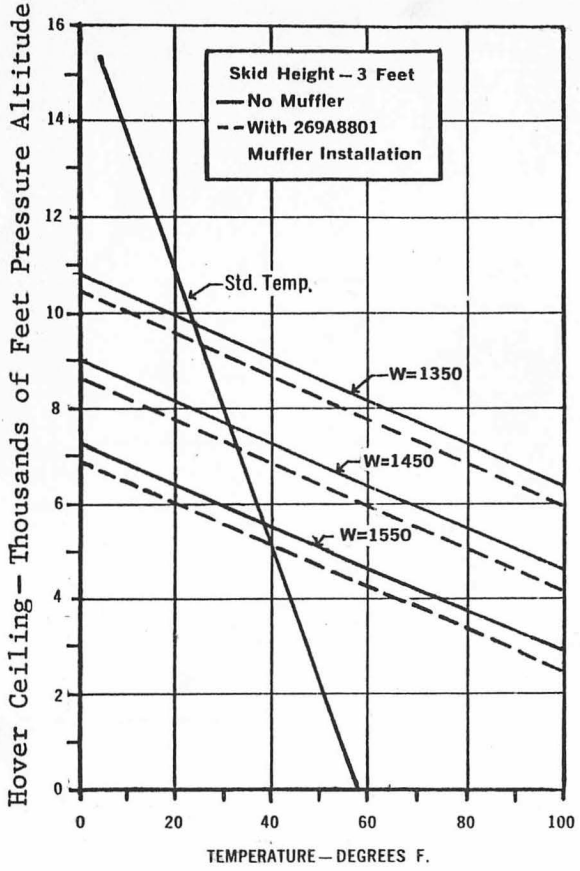
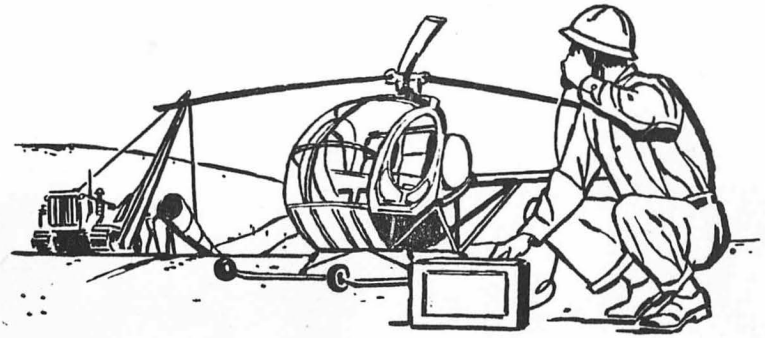


Chart 2

Applicable to Model 269A Helicopters with Lycoming O-360-C2D Engine Serial Nos. L-3818-36 through L-4599-36 and L-4601-36 through L-4640-36

HUGHES MODEL 269A HELICOPTER



WEIGHT AND LOADING INFORMATION

WEIGHT AND LOADING INFORMATION

GENERAL

All helicopters are designed for certain limit loads and balance conditions. Changes in equipment which affect the empty weight and empty weight center of gravity must be entered on the repair and alteration report form ACA-337, in accordance with Civil Air Regulations, which shall then become part of the helicopter file.

To determine that your gross weight and center of gravity for a given flight are within limits, use the following procedure:

(1) From the weight and balance report (or the current form 337) for your helicopter, determine basic weight and basic weight moment.

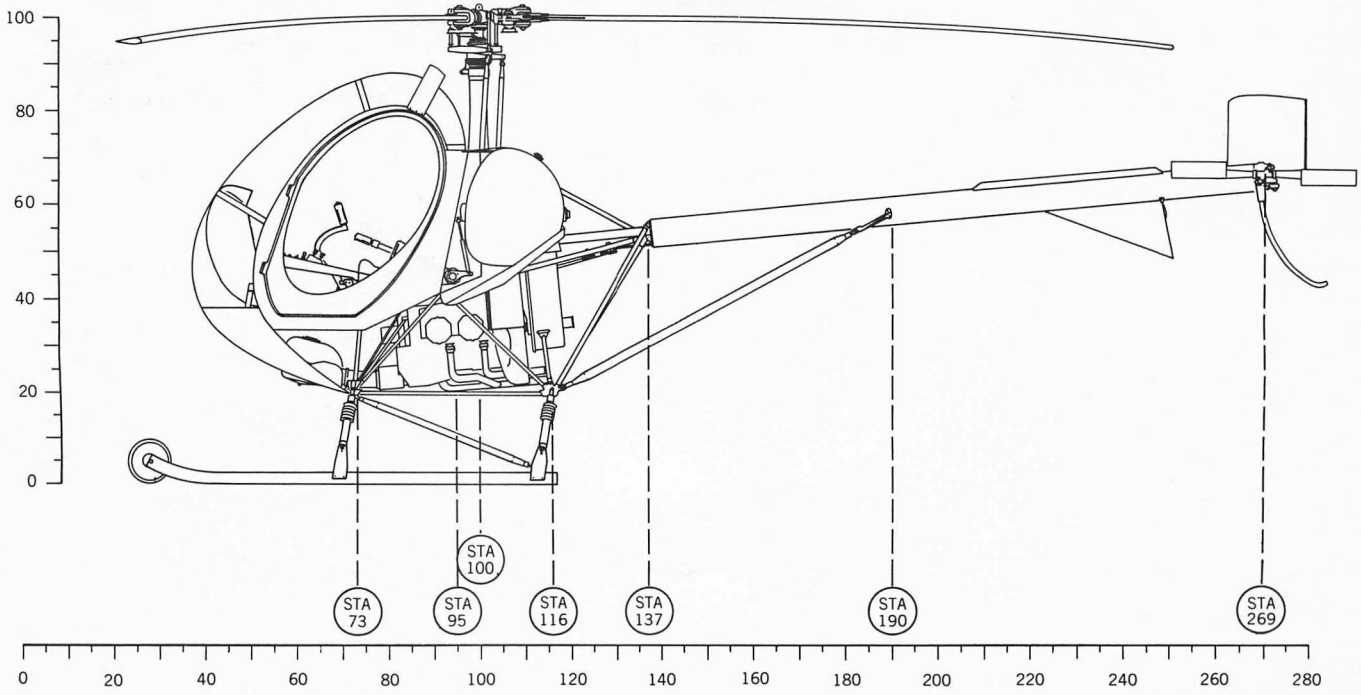
(2) Determine the weights and moments of your disposable load items, using the load chart.

(3) Add these items, as shown in the sample problem.

(4) Plot the totals on the center of gravity chart.

Sample Problem	Weight	Moment 1000/in. lb.
Basic Weight	935	94.3
Fuel (full tank—25 gal.)	150	16.0
Pilot	170	14.2
Passenger	170	14.2
	1425	138.7

Locate this point (1425—138.7) on the center of gravity chart. Since the point falls within the shaded area between lines A & B (full fuel computation limit) the above loading meets all balance requirements.



BALANCE DIAGRAM

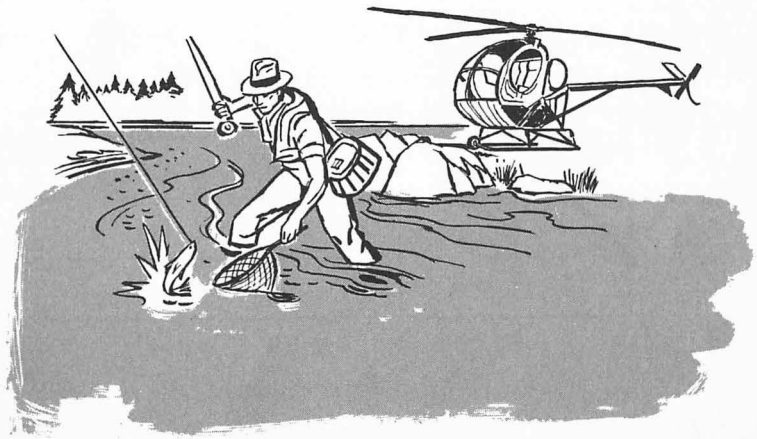
BALANCE DIAGRAM

The horizontal reference datum is located 100 inches forward of the centerline of the rotor.

The approved center of gravity limits are Station 95 and Station 100. All flight loadings must fall on or between these limits throughout the flight.

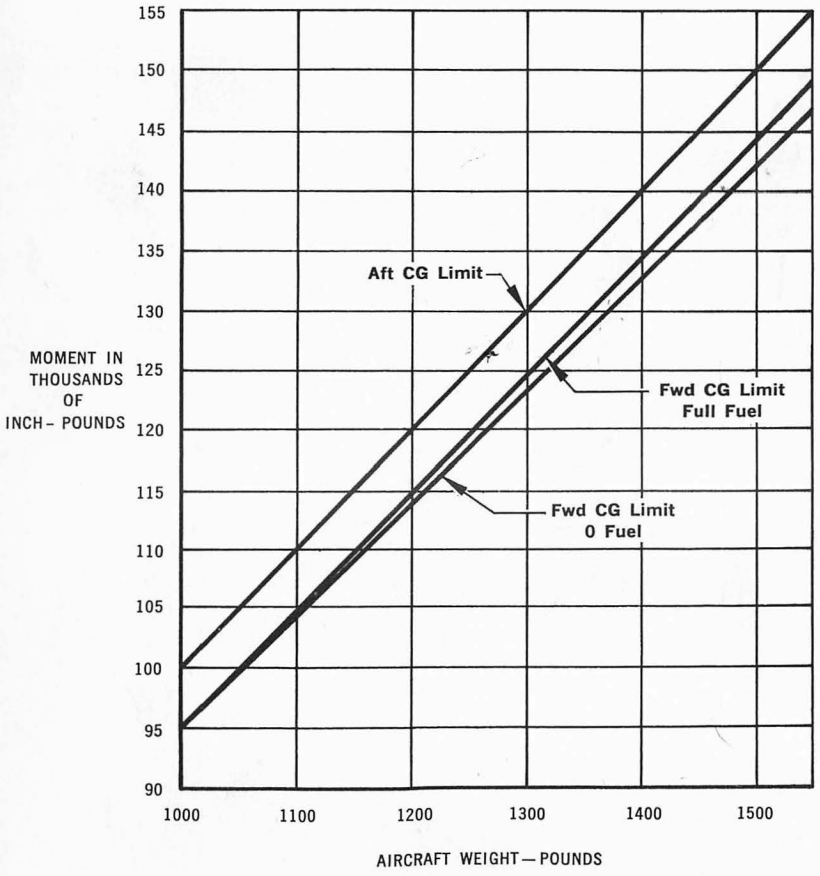
For convenience in measuring during aircraft weighing, Station 100 is marked on the fore and aft fuselage tubes, and Station 267 is marked on the bottom end of the tail boom. The approved levelling pad is clearly marked on the rotor mast housing.

If passenger seat is not occupied, cargo or baggage may be carried thereon up to 200 pounds, provided it is properly secured.

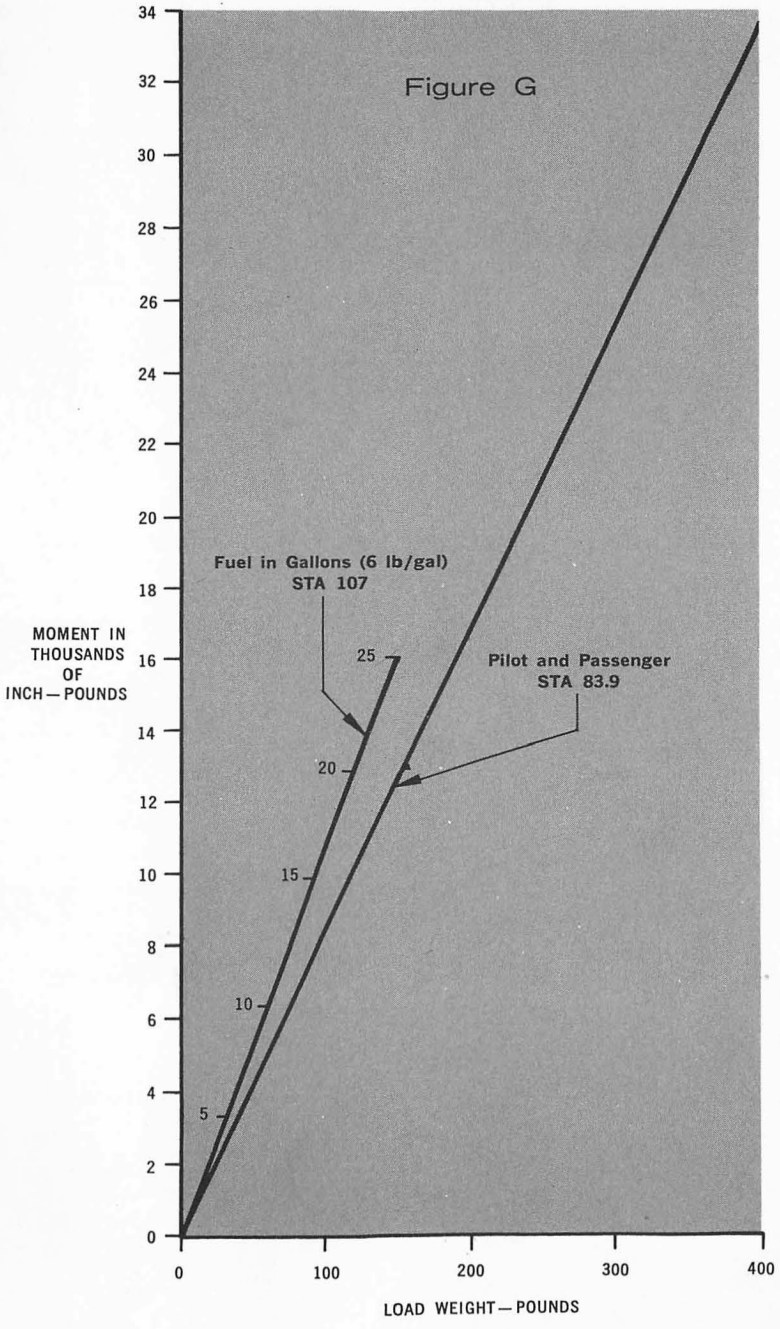


269A
CENTER OF GRAVITY CHART

Figure F



269A LOADING CHART



WEIGHT AND BALANCE REPORT

EQUIPMENT LIST

WEIGHT AND BALANCE REPORT

Aircraft Model 269 A Serial No. 42-0061 N 8741F

Date 13 APRIL 1962 Weighed By Earl L Greenhalgh

Weighing Point	Scale Reading lb.	Tare lb.	Net Weight lb.	Arm	Moment 1000 in. lb.
Left Main	466.8	1.8	465.0	96.00	44.640
Right Main	474.4	1.8	472.8	96.00	45.370
Tail	46.02	24.42	21.6	268.63	5.802
Total (as weighed) ACTUAL			959.2	99.89	95.812

A. Jig point for measurements - Sta. 100 & 267

B. Distance from jig point to ℄ Main Weighing points 4.0 inches.

C. Distance from jig point to ℄ Tail Weighing point 1.63 inches.

D. Moment Arm for main weight points (A-B) 100 - 4.0 = 96.0 inches.

E. Moment Arm for tail weight points (A - C) 267 + 1.63 = 268.63 inches.

Standard Equipment Missing At Time of Weighing			
Item No.	Wt.	Arm	Moment
301	10.6	101.3	1.074
Total	10.6	101.3	1.074

Optional and Surplus Equipment in Aircraft At Time of Weighing			
Item No.	Wt.	Arm	Moment
ENGINE OIL	15.0	91.0	1.365
501	7.8	74.0	.577
503	9.5	66.8	.635
506, 507	3.0		.391
508	1.5	71.0	.107
509	16.0	101.3	1.621
510, 511	.8	88.0	.070
512	.3	277.0	.083
513	1.5	55.0	.083
515	3.3	70.0	.231
517	.2	71.0	.014
518	.9	116.0	.104
Total	59.8	88.31	5.281

Weighing Witnessed by R. Mueller Date April 13, 1962
OMIR 4075

AIRCRAFT WEIGHT AND C. G. CALCULATIONS

	Weight Lb.	Arm In.	Moment 1000 in. lb.
Weight (As Weighed)	959.2	99.89	95.812
Less: Optional and Surplus Weight	- 59.8	88.31	- 5.281
Plus: Missing Std. Equipment	+ 10.6	101.30	+ 1.074
Total - Weight Empty - Std. Aircraft	910.0	100.66	91.605
Plus: Engine Oil	15.0	91.0	1.365
Plus: Optional Equipment and Kits			
DOORS 501	7.8	74.0	.577
DUAL FLIGHT CONTROLS 503	9.5	66.8	.635
NIGHT FLYING KIT 506 THRU 513	23.1	101.9	2.355
OUTSIDE AIR THERMOMETER 517	.2	71.0	.014
EXTERNAL POWER RECEPT 518	.9	116.0	.104
LESS: GENERATOR 12V 20A 301	- 10.6	101.3	- 1.074
Total - Basic Weight ACTUAL	~~955.9~~	~~99.99~~	~~95.581~~

REVISED 5-4-62 LBD.

Example: Most Forward Loading Approved Forward Limit - 95 in.

Basic Weight	956	99.99	95.581
Pilot	170	83.90	14.263
Fuel - Empty Tanks	0		0
Passenger	170	83.90	14.263
Baggage (in passenger seat)	—		—
Total - Gross Weight - Fwd. C. G.	1296	95.76	124.107

Example: Most Aft Loading Approved Aft Limit - 100 in.

Basic Weight	956	99.99	95.581
Pilot	170	83.90	14.263
~~Fuel Full 25 Gal.~~	150	107.00	16.050
Baggage - (in passenger seat) None	—		—
Total - Gross Weight - Aft C. G.	1276	98.66	125.894

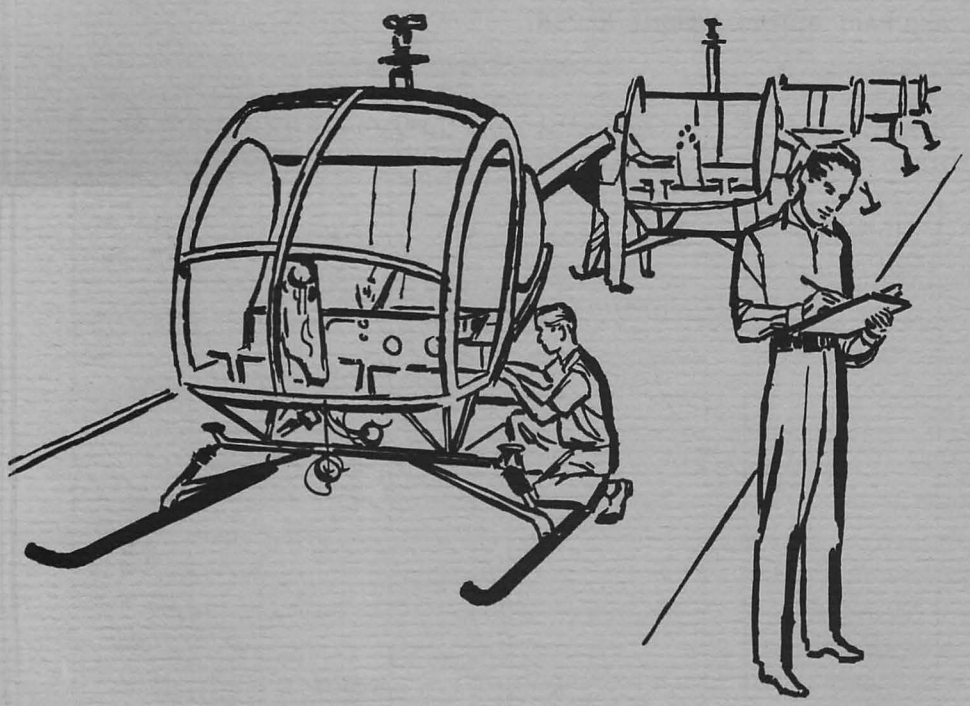
Earle Dunbar 4.24.62

HUGHES TOOL COMPANY - AIRCRAFT DIVISION

BASIC WEIGHT AND BALANCE RECORD
CONTINUOUS HISTORY OF CHANGES IN STRUCTURE OR EQUIP. AFFECTING WEIGHT AND BALANCE

AIRCRAFT MODEL 269A SERIAL NO. 42-0061 REGISTRATION NO. N8741F

DATE	ITEM NO. IN	ITEM NO. OUT	DESCRIPTION OF ARTICAL OR MODIFICATION	WEIGHT CHANGE ADDED (+) Weight	Arm	MOM/1000	REMOVED (-) Weight	Arm	MOM/1000	RUNNING TOTALS BASIC AIRCRAFT Weight	C.G.	MOM/1000
5-4-62			BASIC WEIGHT							955.9	99.99	95.581
5-4-62	515		RADIO VHF	3.3	70.0	.231				959.2	99.89	95.812
5-4-62	516		HEADSETS, MIKE (2)	2.0	97.0	.194				961.2	99.88	96.006
5-4-62			BASIC WEIGHT DELIVERED		Earl & Dreenhelgh					961.2	99.88	96.006
9-12-62			HORIZ. STAB. ASSY. FIX 269A-2511	.6	269.0	.161				961.8	99.99	96.167
9-12-62			LANDING GEAR SKID FIX 269A-3233	2.8	112.0	.314				964.6	100.02	96.481
9-12-62			HUGHES BULLETIN COMPLIED WITH REVISED BASIC WEIGHT	Earl & Dreenhelgh						964.6	100.02	96.481



WEIGHT AND BALANCE REPORT

Aircraft Model _____ Serial No. _____ N _____

Date _____ Weighed By _____

Weighing Point	Scale Reading lb.	Tare lb.	Net Weight lb.	Arm	Moment 1000 in. lb.
Left Main					
Right Main					
Tail					
Total (as weighed)					

A. Jig point for measurements - Sta. 100 & 267

B. Distance from jig point to ℄ Main Weighing points _____ inches.

C. Distance from jig point to ℄ Tail Weighing point _____ inches.

D. Moment Arm for main weight points (A-B) _____ inches.

E. Moment Arm for tail weight points (A-C) _____ inches.

Oil Aboard _____ Gal., Main Gear Box _____ Tail Gear Box _____ _____

AIRCRAFT ACTUAL WEIGHT REPORT

Standard Equipment Missing At Time of Weighing

Item No.	Wt.	Arm	Moment x 1000 in. lbs.
Total			

Optional and Surplus Equipment in Aircraft At Time of Weighing

Item No.	Wt.	Arm	Moment x 1000 in. lbs.
Engine Oil		91.0	
Total			

Weighing Witnessed by ______________________________ Date ______________________

BASIC WEIGHT AND BALANCE RECORD

CONTINUOUS HISTORY OF CHANGES IN STRUCTURE OR EQUIPMENT AFFECTING WEIGHT AND BALANCE

AIRCRAFT MODEL 269A SERIAL NO. REGISTRATION NO.

DATE	ITEM NO.		DESCRIPTION OF ARTICLE OR MODIFICATION	WEIGHT CHANGE						RUNNING TOTALS BASIC AIRCRAFT		
				ADDED (+)			REMOVED (-)					
	IN	OUT		Weight	Arm	Mom./1000	Weight	Arm	Mom./1000	Weight	C. G.	Mom./1000

AIRCRAFT WEIGHT AND C. G. CALCULATION

	Weight Lb.	Arm In.	Moment 1000 in. lb.
Weight (As Weighed)			
Less: Optional and Surplus Weight			
Plus: Missing Std. Equipment			
Total - Weight Empty - Std. Aircraft Computed Actual			
Plus: Engine Oil			
Plus: Optional Equipment and Kits			
Total - Basic Weight			

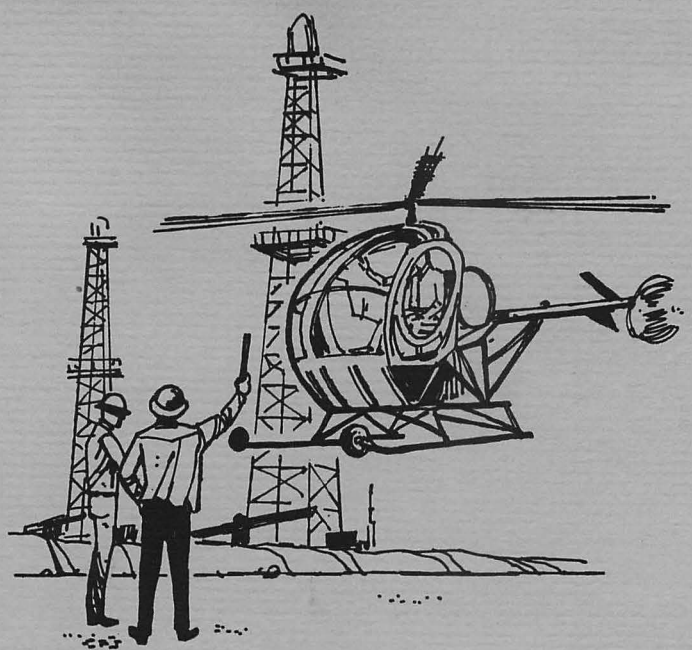
AIRCRAFT WEIGHT AND C.G. CALCULATIONS (CONTINUED)

Example: Most Forward Loading Approved Forward Limit-95 in.

	Weight Lb.	Arm In.	Moment 1000 in. lb.
Basic Weight			
Pilot			
Fuel - Empty Tanks			
Passenger			
Baggage (in passenger seat)			
Total - Gross Weight - Fwd. C. G.			

Example: Most Aft Loading Approved Aft Limit - 100 in.

Basic Weight			
Pilot			
Fuel Full 25 Gal.			
Baggage - (in passenger seat) None			
Total - Gross Weight - Aft C. G.			



HUGHES MODEL 269A HELICOPTER

EQUIPMENT LIST

Report No. JW-00-1 Serial No. _____

FAA Approved Registration No. _____ Date: _____

Check Date		No.	Item	Manufacturer and Part No.	Wt.	Arm
ON	OFF		**Rotor - Required**			
		1	Main Rotor Blade (3)	HTC-AD 269A-1125	66.9	100.0
		2	Hub - Main Rotor	HTC-AD 269A-5305	7.0	100.0
		3	Tail Rotor Assy.	HTC-AD 269A-6003	5.0	269.0
			Engine and Engine Access - Required			
		101	Engine - Incl. Carb.	Lycoming 0-360-C2D	265.7	92.9
		102	Starter	HTC-AD 269A-4627	18.1	98.75
		103	Filter - Carb. Air	HTC-AD 269A-8156	1.0	62.0
		104	Carb. Air Filter Hsg. Assy.	HTC-AD 269A-8141	2.7	66.0
		105	Exhaust System	HTC-AD 269A-8210	7.9	98.4
		106	Fuel Tank	HTC-AD 269A-8316	8.6	107.0
		107	Fuel Pump - Booster	HTC-AD 269A-4626	2.4	104.0
		108	Fuel Strainer	HTC-AD 269A-8313	.9	75.0
		109	Cooling System Scroll	HTC-AD 269A-8535	5.4	108.0
		110	Cooling Sys. Impeller	HTC-AD 269A-8502	10.4	108.0
		111	Oil Cooler	HTC-AD 269A-4684	2.1	77.0
		112	Fuel Pump Eng. Driven	HTC-AD 269A-4628	1.3	84.0
			Landing Gear - Required			
		201	Skid Tubes (2)	HTC-AD 269A-3210	11.6	73.0
		202	Cross Bars (2)	HTC-AD 269A-3118	11.6	94.0
		203	Damper Struts (4)	HTC-AD 269A-3103	5.9	93.0
		204	Tail Skid	HTC-AD 269A-2305	.8	273.4
		205	Fwd. Skid Wheels (2)	HTC-AD 269A-4722	7.8	25.0
		206	Strut. Assem. (4)	HTC-AD 269A-3120	12.0	94.0
			Electrical Equipment - Required			
		301	Generator - 12v, 20a.	HTC-AD 269A-4625	10.6	101.3
		302	Battery (Wet) 12v, 24 AH.	HTC-AD 269A-4617	20.5	117.0
		303	Battery Support	HTC-AD 269A-4120	.2	117.0
		304	Battery Cables	HTC-AD 269A-4703	.6	117.0

EQUIPMENT LIST

(CONTINUED)

Report No. JW-00-1 Serial No. _____

FAA Approved Registration No. _____ Date: _____

Check Date		No.	Item	Manufacturer and Part No.	Wt.	Arm
ON	OFF					
			Interior Equipment - Required			
		401	Seat Back (2)	HTC-AD 269A-4415	5.9	91.9
		402	Seat Pan (2)	HTC-AD 269A-4414	5.8	82.2
		403	Seat Belts (2)	HTC-AD 269A-4699	1.2	85.0
		404	Flight Manual	HTC-AD	1.0	95.0
			Instruments - Required			
		450	Airspeed Indicator	HTC-AD 269A-4600	.86	50.0
		451	Altimeter	HTC-AD 269A-4697	.70	50.0
		452	Compass	HTC-AD 269A-4604	.57	50.0
		454	Eng. Gages: Fuel Quan. Fuel Press. Cyl. Head Temp. Oil Press. Ammeter. Oil Temp.	HTC-AD 269A-4606	.75	54.0
		457	Manifold Press. Ind.	HTC-AD 269A-4603	.82	50.0
		458	Tachometer - Dual - Engine - Rotor	HTC-AD 269A-4605	1.45	50.0
		459	Fuel Quantity Transmitter	HTC-AD 269A-4609	.36	114.0
		460	Drive Shaft-Eng. Tach.	HTC-AD 269A-4618	.66	60.0
		461	Drive Shaft-Rotor Tach.	HTC-AD 269A-4619	.99	70.0
			Optional Equipment			
		501	Doors (2)	HTC-AD 269A-2280	7.8	74.0
		503	Dual Flight Controls	HTC-AD 269A-7700	10.8	66.8
		505	Luggage Case	HTC-AD 269A-4780	12.3	105.0
		506*	Rotating Beacon Nav. Top	HTC-AD 269A-4663	1.7	185.0
		507*	Rotating Beacon Nav. Bottom	HTC-AD 269A-4463	1.7	75.0
		508*	Taxi Light & Landing	HTC-AD 269A-4462	1.9	71.0
		509*	Generator 12v, 50A	HTC-AD 269A-4667	16.0	101.3
		510*	Pos'n Light Left	HTC-AD 269A-4660	.6	88.0
		511*	Pos'n Light Right	HTC-AD 269A-4660	.6	88.0

*Required for night operation

EQUIPMENT LIST

(CONTINUED)

Report No. JW-00-1 Serial No. _____

FAA Approved Registration No. _____ Date: _____

Check Date ON	Check Date OFF	No.	Item	Manufacturer and Part No.	Wt.	Arm
			Optional Equipment (Cont'd)			
		512*	Tail Light	HTC-AD 269A-4661	.4	277.0
		513*	Instruments Lights (2)	HTC-AD 269A-4698	1.7	55.0
		515	Radio - VHF Xmtr - Receiver	HTC-AD 269A-4761	3.3	70.0
		516	Head Set - Mike	HTC-AD 269A-4652	1.0	97.0
		517	Outside Air Temp Ind.	HTC-AD 269A-4664	.2	71.0
		518	External Power Recept.	HTC-AD 269A-4703	.9	116.0
		519	Muffler Inst.	HTC-AD 269A-8801	7.7	126.5
			Muffler	HTC-AD 269A-4593		
		521	Heater Installation	HTC-AD 269A-4770	30.4	87.0
		522	Fire Extinguisher	HTC-AD 269A-4786	5.5	72.0
		523	Ash Tray Assy.	HTC-AD 269A-4657	.20	71.2
		524	Cigar Lighter	HTC-AD 269A-4658	.20	70.6
			Cigar Ltr., Ash Tray Instl.	HTC-AD 269A-4731		
		525	Running Time Meter Instl.	HTC-AD 269A-4745	.80	83.5
		526	Starter	HTC-AD 269A-4649	18.1	98.75
		527	Brkt. Instl. Universal Mt.	HTC-AD 269A-4799	1.1	97.0

*Required for night operation.

MAINTENANCE

SECTION V

MAINTENANCE

I. General

To insure the best possible performance and dependability of your Hughes Helicopter, certain inspection and maintenance requirements must be followed. It would be well to stay in contact with your Hughes Dealer and take advantage of his knowledge and experience to provide you with factory-trained personnel and up-to-date servicing information.

The following recommendations are designed to provide adequate maintenance under normal operating conditions. More frequent checks of items such as air filter, fuel strainer, and lubrication points should be made when operating under adverse weather conditions, such as heavy dust, sand or rain.

Civil Air Regulations require that all airplanes have a periodic (annual) inspection as prescribed by the administrator, and performed by a person designated by the administrator. In addition, any repairs and service other than those specified in this manual must be accomplished in accordance with the Handbook of Maintenance Instructions and performed by a person designated by the administrator.

II. Inspections

A. Daily Preflight Inspection

1. All protective covers and locking devices removed.

2. All fairings and inspection plates secured.
3. Inspect for obvious discrepancies:
   a. Cabin enclosure, tail boom, and other structural components.
   b. Landing gear installation (shock struts for inflation, ½" min. fwd., ⅜" min, rear). See Page 5.6.)
   c. Main rotor head and blades; check blades for correct phase (See Page 5.1) dampers for oil level.
   d. Tail rotor installation:
      1. Drive shaft
      2. Teetering hinges for freedom
      3. Blades for voids (See Page 5.10)
      4. Abrasion strips for adherence
      5. Gear box for leaks and proper oil level
4. Check engine oil level.
5. Drain fuel tank sump and strainer bowl.
6. Check generator drive belt tension.
7. Check carburetor air cleaner for security and air inlet for obstructions.
8. Fuel tank serviced, cap installed. Retention straps for security.
9. Check drive belt system for correct tension and condition; (See Page 5.8.) CAUTION: Maintain hand pressure against preload while disengaging clutch.)
10. Check battery for security and obvious discrepancies.
11. Check main gear box for leaks and proper oil level. (See Page 5.3.)
12. Ground handling wheels in forward position and secured.

13. Cabin equipment in place and secured.
14. Check flight controls for freedom of movement and full travel.

B. 25 Hour Inspection

In addition to the daily preflight, the following items are required.

1. Complete lubrication as specified in lubrication chart. (See Pages 5.14 and 5.15.)
2. Inspect main rotor blades for scratches or other damage, vent holes for obstructions and adherence of abrasion strips.
3. Clean carburetor air filter, replace if necessary.
4. Check free wheeling clutch for leaks; (See Page 5.8.)
5. Drive system
   a. Inspect belts for excessive wear or breaks.
   b. Check free wheeling clutch for smooth operation and oil level. (See Page 5.8.)
6. Check engine drive shaft spline for excessive grease leaks.
7. Check tail drive shaft splined couplings for grease leaks.
8. Check main rotor blade dampers for freedom and correct setting. Dampers to be set in low load stage to 5½ lbs. ± ½ lb. pull measured with spring scale at blade tip. Pitch bearing assembly and blade should be in approximate level attitude while checking pull at blade tip. (See maintenance manual for detailed procedure.)

C. 50 Hour Inspection

In addition to the daily preflight and 25 hour inspection, the following items are required:

1. Check flywheel and impeller screws for looseness.
2. Check sparkplug elbows and shielding nuts for security.
3. Drain and refill oil sump with new oil.
4. Remove and clean suction and pressure oil strainers.
5. Drain and clean fuel strainer.
6. Check intake and exhaust systems for leaks and looseness.
7. Check priming system for leaks.

D. 75 Hour Inspection

Same as 25 hour inspection. Complete as per Part 2B, items 1-8.

E. 100 Hour Inspection

It is recommended that a thorough inspection of the entire helicopter be performed at this time. In addition, certain inspection items are required that should be accomplished only by properly trained personnel. For complete information, refer to Handbook of Maintenance Instructions.

F. 400 Hour Inspection

The 400 hour inspection requires some disassembly of the main rotor system. It is recommended that only properly trained personnel perform this inspection. For details and procedure, refer to the Handbook of Maintenance Instructions.

III. Overhaul and Retirement Schedules

A. Overhaul

Overhaul every 1000 hours the following components:

Main Rotor Assembly

Tail Rotor Assembly

Belt Drive Assembly

Main Transmission Assembly

Tail Transmission Assembly

Flight Control System

Refer to Handbook of Maintenance Instructions for overhaul procedures.

B. Retirement

The following components shall be removed from the helicopter at the periods specified:

269A-6247	Tail Rotor Hub	960 hours
269A-6108	Tail Rotor Torsion Shaft	1200 hours
269A-6124	Tail Rotor Blade	960 hours
269A-1125	Main Rotor Blade	1366 hours
269A-2511	Horizontal Stabilizer	2500 hours
269A-5701	Tail Drive Shaft	970 hours
269A-5607	Spline, Tail Drive Shaft	970 hours
269A-5609	Input Shaft, Tail Rotor Transmission	970 hours
269A-5304	Main Rotor Drive Shaft and Hub Assembly	1195 hours
269A-5103	Main Transmission Pinion Assembly	1780 hours
269A-5504	Lower Pulley Coupling Shaft	1500 hours

Removed parts should be tagged with a record of total time used and stored for possible future use. Hughes Tool Company—Aircraft Division is continuing the program to determine whether further extensions of service life are possible. These retirement times are FAA approved and mandatory. They are not to be increased without FAA engineering approval. Provisions have been made in the Aircraft Log Book for recording component history.

IV. Service Instructions

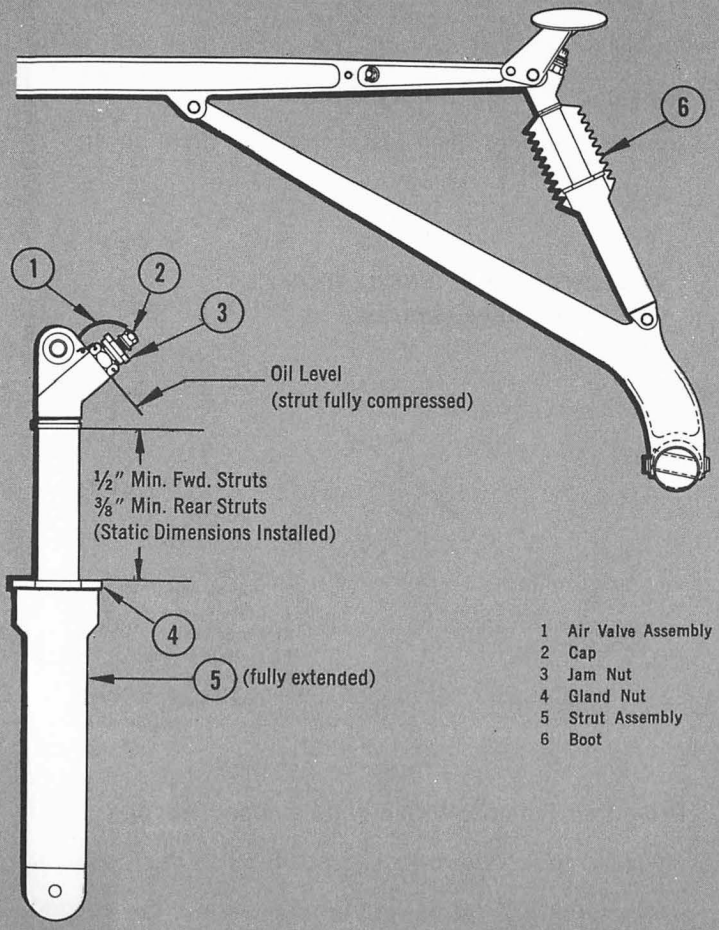
A. Landing Gear

Jack helicopter until skid is clear of ground. Remove strut assembly (5). CAUTION: Remove cap (2) and relieve air pressure by loosening jam nut (3). Then remove air valve assembly (1). Slide boot up to expose gland nut (4), extend strut fully and loosen gland nut three or four turns. Fill with MIL-O-5606 Hydraulic Oil. Purge by installing air valve assembly finger tight and compressing strut to force air past gland nut. Repeat until bubble-free oil appears at gland nut. Tighten gland nut. Compress strut with air valve removed. Oil level should be flush with the port when the strut is fully compressed and the port is vertical. While in this position, install air valve and safety. Loosen jam nut and charge strut to 150 psi.

CAUTION: Do not loosen jam nut too far, as valve seal may fall inside strut. Close valve by tightening jam nut, install cap and replace boot.

NOTE: Do not charge strut with weight of helicopter on landing gear.

LANDING GEAR
(Typical (4) places)



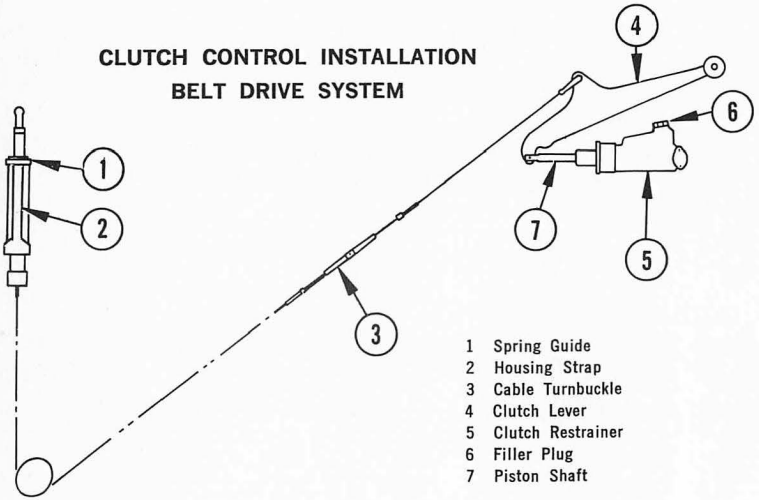
1 Air Valve Assembly
2 Cap
3 Jam Nut
4 Gland Nut
5 Strut Assembly
6 Boot

B. Belt Drive System

Free Wheeling Clutch: Remove top belt drive cover. With the helicopter level, rotate upper pulley until in this position, remove two top plug bolts, seals and washers. Fill with MIL-L-2105, SAE 90 oil to oil level indicated on cap.

CAUTION: Do not over fill. Re-install plug bolts with seals and washers. Safety in accordance with standard aircraft practice. Then install top belt drive cover.

CLUTCH CONTROL INSTALLATION
BELT DRIVE SYSTEM



1 Spring Guide
2 Housing Strap
3 Cable Turnbuckle
4 Clutch Lever
5 Clutch Restrainer
6 Filler Plug
7 Piston Shaft

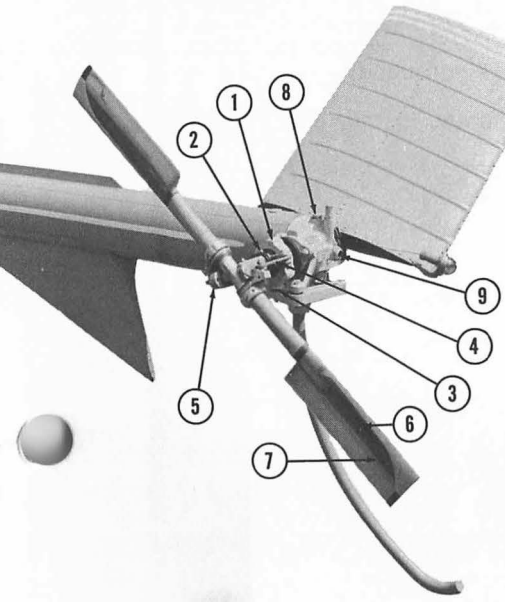
Drive Belt Tension: With engine stopped, engage clutch lever (4) to full down locked position. In this position, center line of spring guide (1) should be aligned within the black paint band on the housing strap (2). If adjustment is necessary, cut safety wire loose from

cable turnbuckle (3). Shorten cable to lower spring guide and lengthen cable to raise spring guide. Resafety turnbuckle in accordance with standard aircraft practice.

Clutch Restrainer: With piston shaft (7) extended aft (clutch lever engaged), remove filler plug (6) and fill to ½" below top of boss with MIL-O-5606 Hydraulic Oil. Install filler plug and actuate clutch lever two or three times (engaged to disengaged). Recheck oil level and repeat above procedure if necessary. CAUTION: Do not engage or disengage clutch lever with filler plug removed.

C. Tail Rotor Assembly

The tail rotor assembly including the links and pitch control is a factory-balanced unit. **All bolts, washers, nuts, etc. should not be disturbed as they are a part of this unit.**



1 Pitch Control Assembly
2 Grease Fitting, Pitch Control Spline
3 Grease Fitting, Pitch Control Bearing (bottom)
4 Links (2)
5 Grease Fitting, Teetering Bearings (2)
6 Blade Bond Area (typical 4 places)
7 Spar Trailing Edge (typical 4 places)
8 Tail Gear Box Filler Plug
9 Tail Gear Box Sight Glass

1. Lubrication: Check lubrication guide for frequency and type of lubricant.
2. Blade Bond Inspection
   a. A minimum of 80% of the bond area must be complete at all times. Allowable voids, ½ square inches maximum each, and at least ¼ inches apart.
   b. A maximum of two voids at trailing edge of spar on each blade no more than ½ square inches in size and at least 5 inches apart.
3. Tail Gear Box

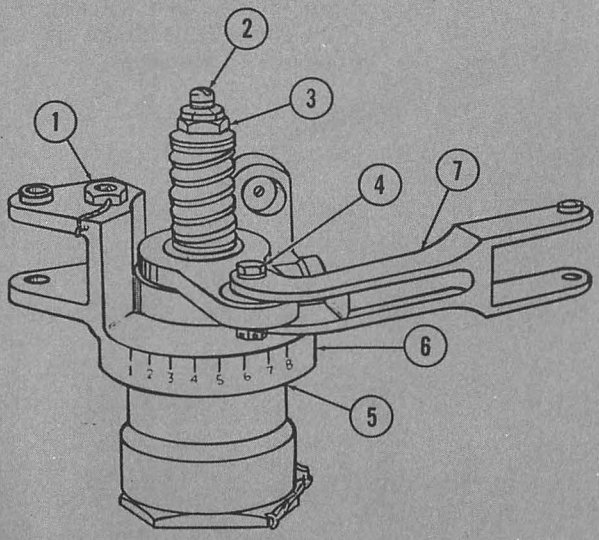
   Filling: cut safety wire, remove filler plug (8). Fill with MIL-L-2105 SAE 90 oil to level indicated on sight glass (9). Re-install filler plug and safety.

D. Main Rotor Damper

Filling: Cut safety wire and remove filler plug (1) (remove vent screw (2) at top of shaft before filling to vent). Fill with MIL-O-5606 Hydraulic Oil to center line of sight glass (6). Install screw. Install filler plug and safety.

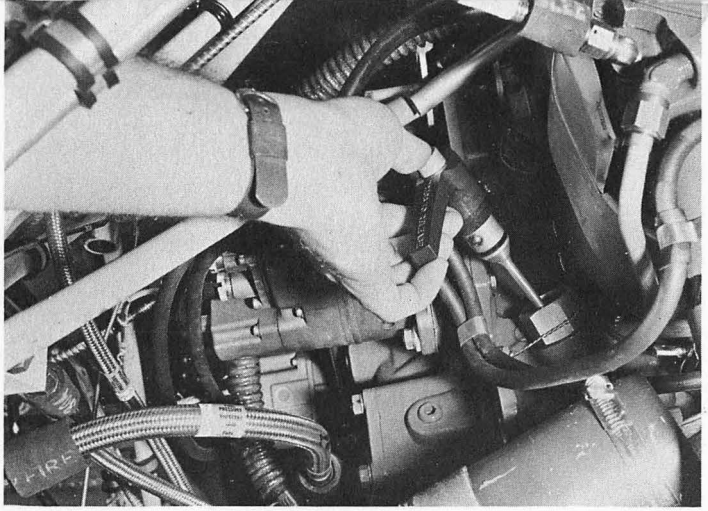
CAUTION: Do not move adjustment nut (3). Dampers are run in and pre-set at the Factory. In the event that re-adjusting is necessary, your Hughes Dealer has the proper equipment and trained personnel to accomplish this.

MAIN ROTOR BLADE PHASE: To insure that main rotor blades are in proper phase, link bolts (4) should be centered between Numbers 4½ and 5 on damper housing (5) while in the low load stage. All three blades should be at the same setting. The low load stage is evidenced by moving main rotor blade at tip slightly fore and aft and noting a small amount of travel with little resistance.



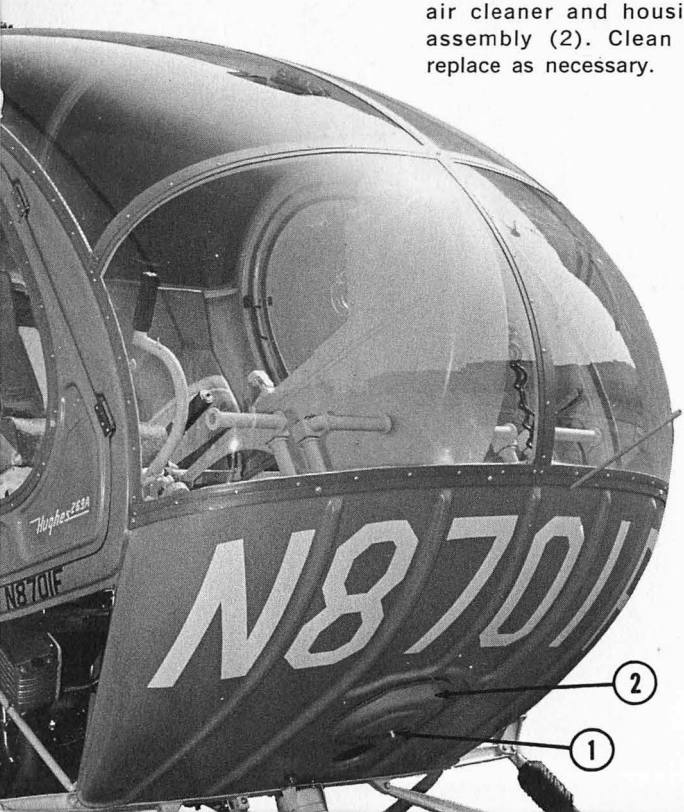
MAIN ROTOR BLADE DAMPER

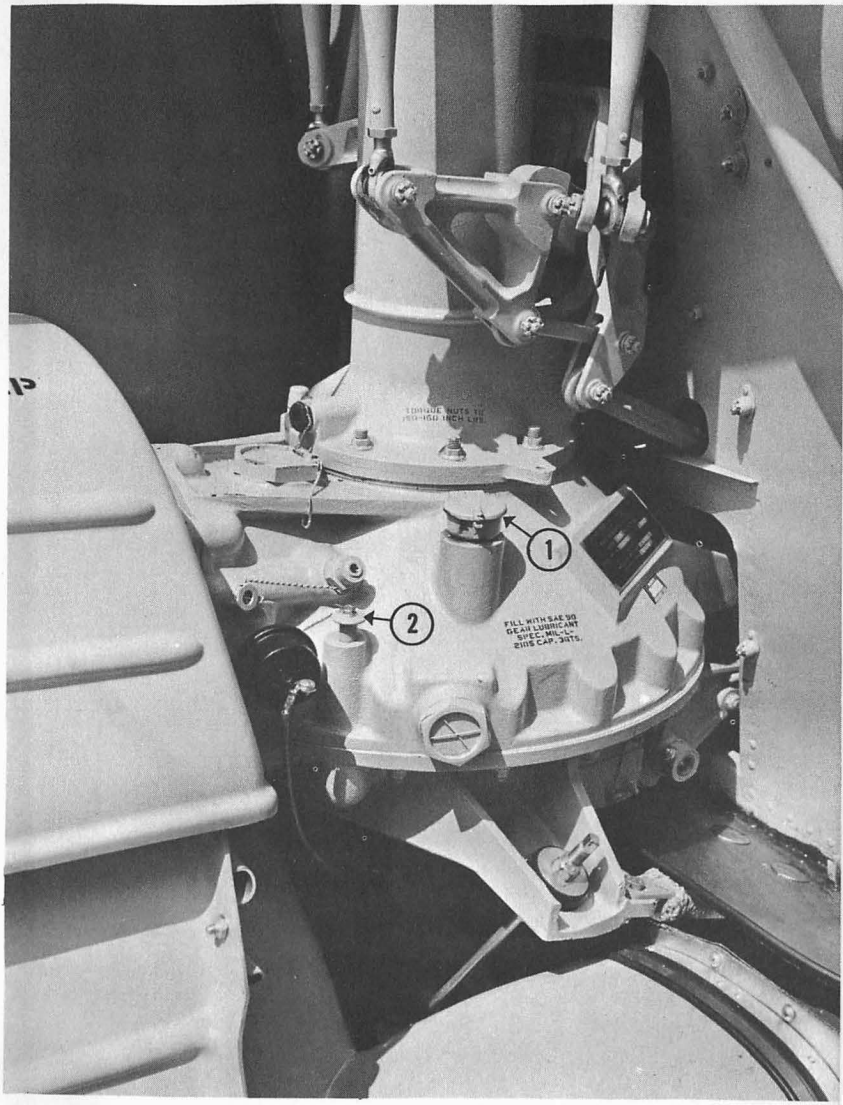
1 Filler Plug
2 Vent Screw
3 Adjustment Nut
4 Link Bolt
5 Damper Housing
6 Sight Glass
7 Link



POWER PLANT
Checking engine oil sump

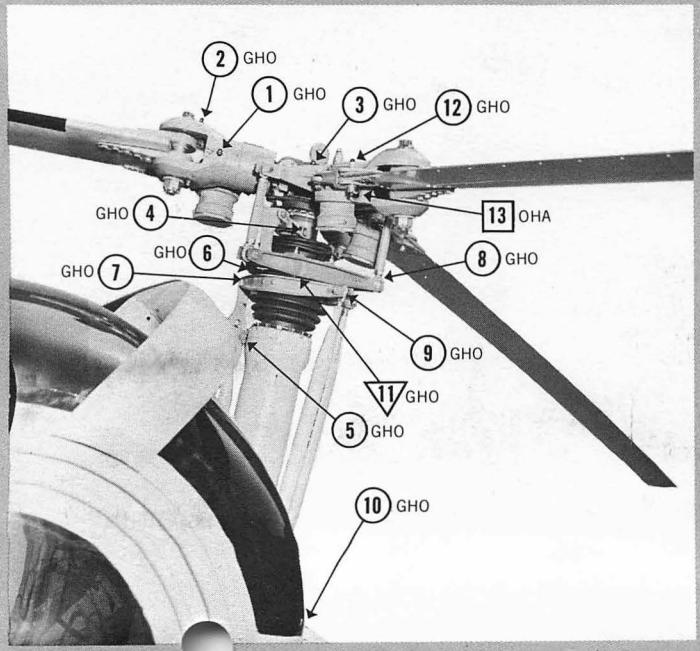
CARBURETOR AIR CLEANER — Servicing: Remove lock pin (1). Lower air cleaner and housing assembly (2). Clean or replace as necessary.





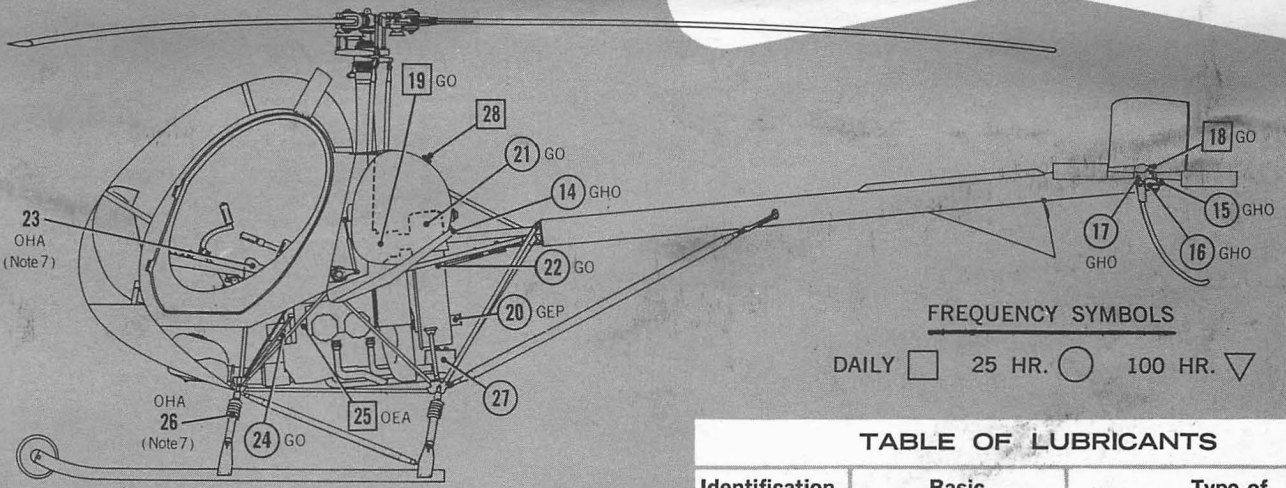
MAIN GEAR BOX—Filling: Cut safety wire from filler cap (1). Fill with MIL-L-2105 SAE 90 oil to full mark indicated on dip stick (2).

PARTS NOMENCLATURE



1. Pitch Bearings—Main Rotor (3 places)
2. Lead-Lag Hinge Bearings (6 places)
3. Flapping Hinge Bearings (3 places)
4. Arm, Swash Plate Scissors Upper (4 places)
5. Arm, Swash Plate Scissors Lower (4 places)
6. Link, Swash Plate Scissors Upper (1 place)
7. Link, Swash Plate Scissors Lower (1 place)
8. Rod, Main Rotor Pitch Arm Control (6 places)
9. Control Rods, Mixer to Swash Plate (6 places)
10. Control Rod, Main Gear Box to Mixer (2 places, not shown)
11. Gimble, Main Rotor Swash Plate (4 places, see Note)
12. Sleeve, Main Rotor Damper Retention Fitting (3 places)
13. Damper Assy. Main Rotor Blade (3 places)
14. Couplings, Tail Drive Shaft (2 places)
15. Bearing, Tail Rotor Swash Plate Control (1 place)
16. Spline, Tail Rotor Swash Plate (1 place)
17. Bearings, Tail Rotor Fork Teetering (2 places)
18. Transmission, Tail Rotor
19. Transmission, Main Rotor
20. Coupling, Engine Drive (2 places)
21. Clutch Assy. Over-Running
22. Idler Frame Shaft
23. Damper Assy. Belt Drive Clutch
24. Carburetor Links (3 places)
25. Engine Sump
26. Strut Assy. Landing Gear Damper (4 places)
27. Battery
28. Fuel Tank

Note: Access to main rotor swash plate gimble, slide top boot up and bottom boot down. **Caution:** Clean all dust and dirt from boots and adjacent components before exposing gimble for inspection or lubrication.



FREQUENCY SYMBOLS

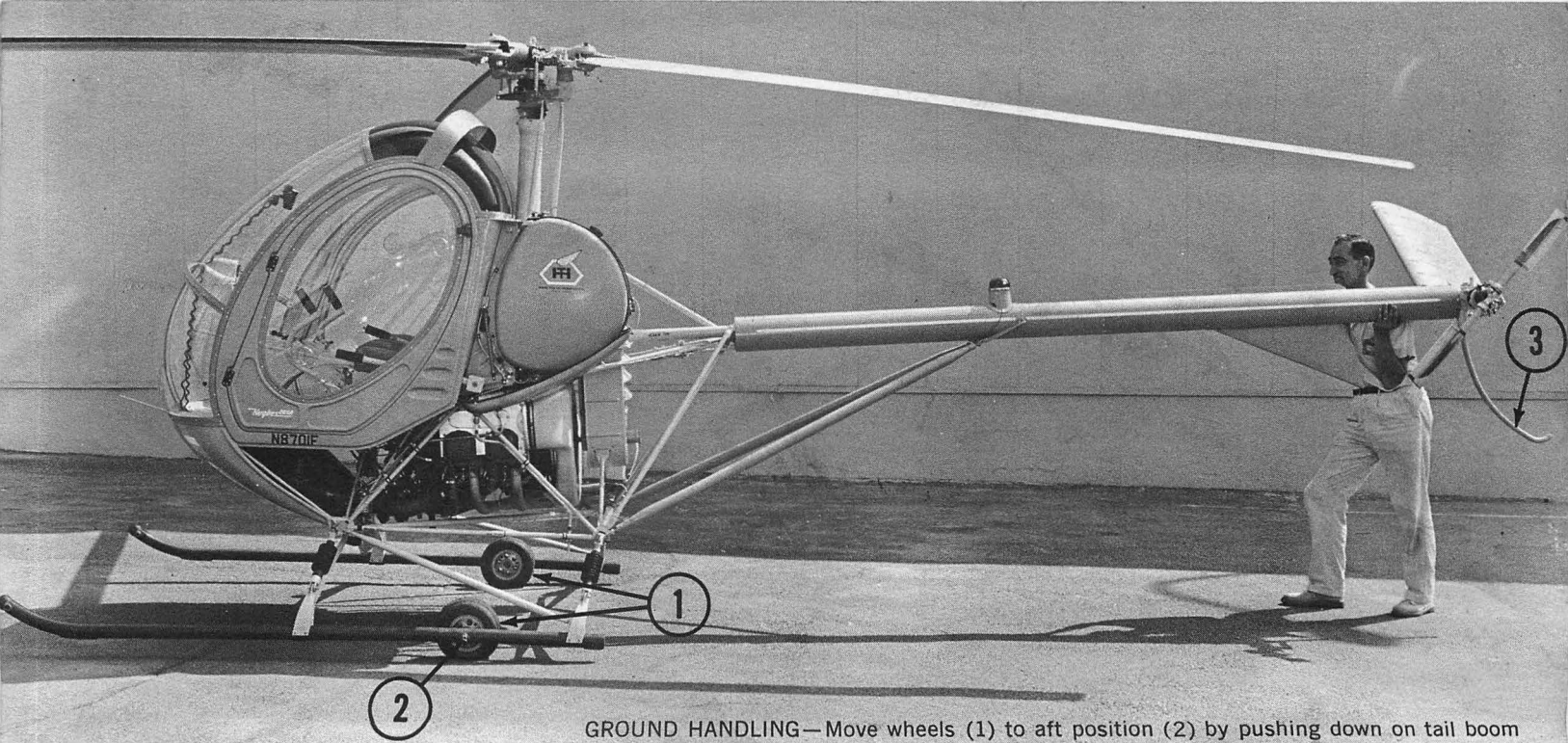
DAILY □ 25 HR. ○ 100 HR. ▽

SERVICE NOTES

1. Fittings—Clean before lubricating.
2. Lubricate through fittings until new grease appears at the part being lubricated.
3. Wipe fittings and parts clean after lubrication.
4. Bushings, pins, etc.—Lubricate all bushings, pins, and connections having limited motion on assembly.
5. On Assembly—Parts to be cleaned and lubricated on assembly and recleaned and relubricated on major overhauls or whenever parts are disassembled for any reason.
6. Nylon, teflon bushings and bearings—Lubricate on assembly with MIL-L-2105 lubricant.
7. Check service manual.

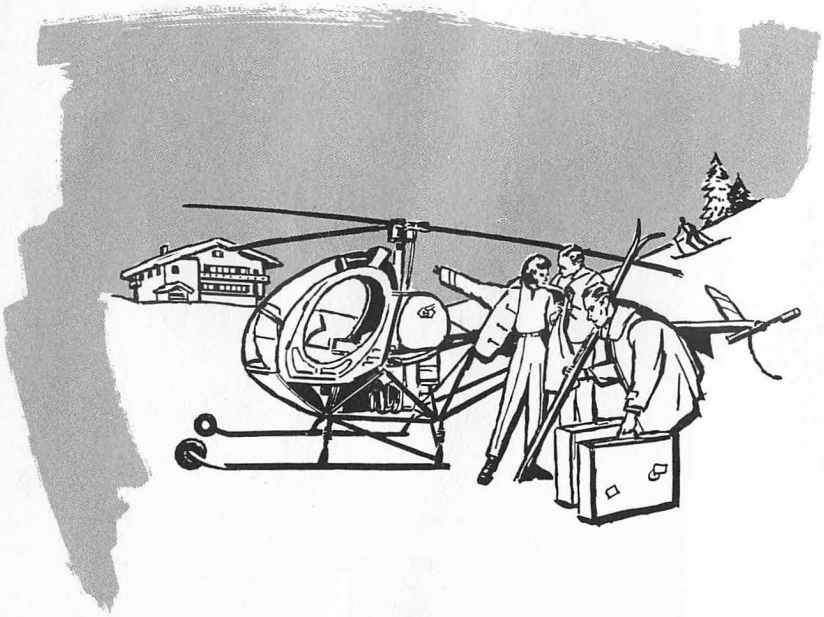
TABLE OF LUBRICANTS

Identification Letters	Basic Specification	Type of Lubricant
GO	MIL-L-2105	SAE 90 Oil
GHO	MIL-G-25537	Grease (oscillating brg.)
GEP	Shell Alvania No. 1	
OEA	MIL-L-6082	Oil, Aircraft Engine
GLT	MIL-G-3278	Grease, Aircraft & Instrument
OHA	MIL-O-5606	Hydraulic Fluid, Petroleum Base



GROUND HANDLING—Move wheels (1) to aft position (2) by pushing down on tail boom (until skid (3) rests on ground) and pulling up on forward part of skid until clearance is obtained to install wheels. Support boom as illustrated for ground handling. Maintain 60-70 psi tire pressure for ground handling—always return wheels to forward position prior to flight.

MOORING—Secure main rotor blade, as shown. Blades should not be drawn down beyond droop stop control on main rotor hub. This will eliminate bending of the main rotor blade spar. Position cyclic stick in neutral, collective stick full down and lock all friction devices.



CARING FOR YOUR HUGHES HELICOPTER

EXTERIOR FINISH

The painted exterior surfaces of your new Hughes Helicopter have been finished with high grade synthetic materials selected for their toughness, elasticity, and excellent adhesion. With a minimum of care, they will retain their original beauty for many years.

As with any paint applied to a metal surface, the desired qualities of the paint develop slowly throughout an initial curing period which may be as long as 90 days after the finish is applied. During this curing period, some precautions should be taken to avoid damaging the finish or interfering with the curing process. The finish should be cleaned only by washing with clean, cold water and mild soap, followed by a rinse with cold water and drying with cloths or a chamois. Do not use polish or wax, which would exclude air from the surface. Once the finish has cured completely, it may be waxed with a good automotive wax.

Fluids containing dyes, such as fuel and hydraulic oil, accidentally spilled on the painted surface, should be flushed away at once, to avoid a permanent stain. Battery electrolyte must be flushed off at once, and the area neutralized with an alkali such as baking soda solution, followed by a thorough rinse with clear water.

WINDSHIELD CANOPY AND DOOR WINDOWS

The plastic windshield and windows should be kept clean at all times. To prevent scratches and crazing, wash them care-

fully with plenty of soap and water, using the palm of the hand to feel and dislodge dirt and mud. A soft cloth chamois or sponge may be used. Do not rub. Rinse thoroughly, then dry with a clean, moist chamois. Rubbing the surface of the plastic with a dry cloth builds up an electrostatic charge so that it attracts dust particles in the air. Wiping with a moist chamois will remove both the dust and this charge. Remove oil and grease with a cloth moistened with kerosene. Never use gasoline, benzine, alcohol, autone, etc. These materials will soften the plastic and may cause it to craze.

INTERIOR CARE

To maintain that new look, the cockpit area should be cleaned regularly with a vacuum cleaner.

Before using any solvent on upholstery, read instructions on the container carefully and test it in an obscure place on the fabric to be cleaned.

Oily spots may be cleaned with household spot removers, used sparingly. Never saturate the fabric with a volatile solvent. All plastic trim, control knobs, etc. may be cleaned with a damp cloth. Never use a volatile solvent on plastic.

BATTERY

The 12 volt, 24 ampere hour lead acid battery used in your helicopter has many advantages, including lighter weight, less space, and may be indefinitely stored, either charged or discharged, without damage.

To obtain the most service life of the battery, the following instructions should be followed. Check water level every 25 hours or sooner if in hot climates, add water (most drinking waters are acceptable) to cells as needed to a level of "the

bottom of the filling tube." Water level should not be allowed to go below a level which exposes the protector above the separator.

During flight, the battery will receive sufficient charge or current from the voltage regulator and generator system provided they are functioning properly. A low-charged battery may be detected quickly with a standard hydrometer reading. Too much charge will be indicated by frequent water additions. If it is necessary to recharge the battery, remove it from the helicopter and bench charge at the rate of two (2) amperes per hour. Stop charge when three successive hourly readings of the lowest gravity (hydrometer) reading cell, and the battery voltage show no increase. If battery voltage is above 14.4 volts, the battery is serviceable. Full charge hydrometer reading (with the water level at the bottom of the filling tube) is 1.250 to 1.300 at 80°F.

ROTOR BLADES

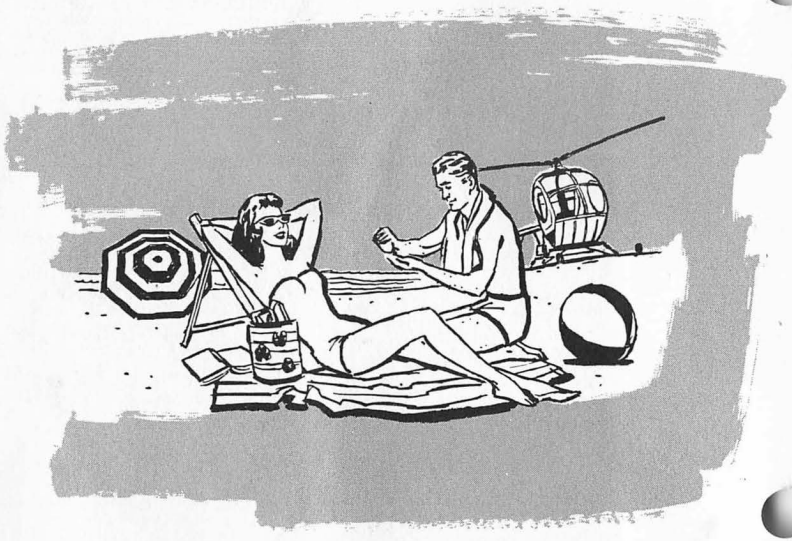
The all metal main rotor blades are constructed of an aluminum extruded spar and one piece wrap around skin. The tail rotor blades are constructed of a steel spar and a fiberglass skin bonded to the spar. The blades should be kept clean and washed frequently with a mild soap and water solution. After cleaning, a light coat of wax applied to the main rotor blades will ensure additional protection.

Certain precautions should be followed in cleaning and handling the rotor blades. No volatile solvents or abrasive materials should ever be used on the blades. These materials could loosen the bonding agent or damage the finish.

The aluminum skin on the main rotor blade has an anodize treated finish which provides excellent corrosion resistance. If, during the service life of the blade, the anodize finish is worn off, the exposed aluminum should be thoroughly cleaned and protected with a metal primer such as zinc-chromate, or chromodize touch-up.

While cleaning, inspecting, or handling the rotor blades, extreme care should be taken not to scratch the skin in any way. And, at no time should any force or weight be applied to the blades (especially at the tip) that would tend to bend the spar.

For any additional service or maintenance information, see your Hughes 269A Dealer.



MANUFACTURER'S WARRANTY

Manufacturer warrants each new helicopter manufactured by it to be free from defects in material and workmanship under normal use and service provided, however, that this warranty is limited to making good at Manufacturer's factory any part or parts hereof which shall, within ninety (90) days after delivery of such helicopter to the original purchaser, or fifty (50) hours of operation, whichever shall occur first, be returned to Manufacturer with transportation charges prepaid, and which upon Manufacturer's examination shall disclose to its satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and all other obligations or liabilities, direct or consequential, on the part of the Manufacturer, and Manufacturer neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale of its helicopters.

This warranty shall not apply to any helicopter which shall have been repaired or altered outside Manufacturer's factory in any way so as, in Manufacturer's judgment, to affect the helicopter's stability or reliability, nor which helicopter has been subject to misuse, negligence or accident. Manufacturer makes no warranty whatever with respect to wheels, ignition, engines, starting devices, generators, batteries, instruments, or other trade accessories inasmuch as they are usually warranted separately by their respective manufacturers.

HUGHES TOOL COMPANY
AIRCRAFT DIVISION